

sion, has long been known, it has not been made full use of in discussing atmospheric phenomena, such, for example, as the rainfall on mountain slopes. The works of Sir W. Thomson, Reye, and Peslin bring us important information regarding the movements of ascending air, for they deduce from the mechanical theory of heat the laws of variation of temperature in ascending and descending dry and moist currents. Calculating in the first instance the fall of temperature in ascending currents where no condensation of moisture takes place, the following result is obtained:—For every 100 metres rise, nearly exactly  $1^{\circ}$  C. is lost, whatever the original level and temperature may have been; and conversely for descending currents. If any vapour be present, as long as it is not condensed, it reduces this rate only to a very slight extent. As to the relation between pressure and temperature, a fall of 20 mm. would be accompanied by a decrease of  $2^{\circ}$  C., but since such a fall takes something like twenty-four hours at least, changes of this kind are probably overborne and hidden by simultaneous changes depending on other causes. Secondly, he calculates the loss of temperature in ascending currents becoming saturated and continually losing by condensation part of their moisture. This quantity differs greatly with the amount of vapour originally in the air, and therefore with the temperature at which the air becomes saturated. By means of a formula arrived at by Dr. Hann, a table has been constructed, showing the calculated loss of heat at various pressures, heights, and temperatures. An ascending column of air obeys the law for dry air until it reaches the dew-point; after this the table should be consulted. Supposing a current at  $10^{\circ}$  C. to impinge on a mountain slope and rise to the summit, 2,600 metres high, if moist, it loses  $14^{\circ}8'$  C.; if dry,  $26^{\circ}$ . But in descending the lee side it gains, whether moist or dry,  $26^{\circ}$ . If it was saturated at the mountain top, it will be relatively very dry after its descent; and if originally moist, about  $10^{\circ}$  warmer than it was on the windward side.

## SOCIETIES AND ACADEMIES

### LONDON

Linnean Society, Nov. 19.—Dr. G. J. Allman, F.R.S., president, in the chair.—Mr. Daniel Hanbury exhibited specimens of the rose cultivated on the southern slopes of the Balkan for the production of attar of roses, which Mr. J. G. Baker stated to be probably a variety of *R. damascena*.—The President then read a paper on *Stephanoscyphus mirabilis*, the type of a new order of Hydrozoa. The author described a remarkable organism which occurs imbedded in sponges on the southern shores of France. It forms composite colonies which have a general resemblance to a campanularian hydroid, with its cup-like hydrothecæ or so-called polype cells, opening on the surface of the sponge, and, when the animal extends itself, giving exit to a beautiful crown of tentacles. It has, however, though a true hydrozoan, no immediate relation with the campanularians or with any other hitherto recognised order of Hydrozoa; for the hydrothecæ-like receptacles are occupied not by a hydranth or polypite, but by a body which has all the essential characters of a Medusa; and the tentacles which are displayed when the animal extends itself are really the marginal tentacles of a Medusa. It is, further, provided with the radiating and circular canals of a true Medusa. The animal is essentially a composite colony of medusiform zooids included in a system of chitinous tubes, from which, like a campanularian hydroid, each zooid has the power of extending itself, and within which it can again retreat. The author regarded the *Stephanoscyphus mirabilis* as the type of a new order of Hydrozoa, to which he assigned the name of "Thecomedusæ." He regarded *Stephanoscyphus* as affording a convincing proof of the homology on which he had formerly insisted in paralleling the tentacles of a hydranth with the radiating canals of a Medusa. An interesting discussion followed, in which Prof. Busk, Dr. Murie, and others bore testimony to the great importance of Prof. Allman's discovery.—Dr. Masters read a "Monograph of Durioneæ." The paper contains an enumeration of the genera and species of the tribe Durioneæ, together with descriptions of the new species found by Beccari in Borneo, &c. It is accompanied by some remarks on the morphology and geographical distribution of the group. In both respects the group is very distinct. The peculiar scaly pubescence, the compound stamens, the (in some cases) very peculiar anthers, and the muricate fruits, all constitute remarkable features. The question of "divided" or "compound"

stamens, which has of late been re-discussed by Chatin, is alluded to, with the result that the author adheres to his previously expressed views on the subject—views, moreover, supported by those of Payer, Sachs, Baillon, Van Tieghem, and others. The nature of the petals in Malvales in general is also touched on; sometimes these appear to be autonomous organs, while in other cases they seem to form part and parcel of the staminal phalanges. (For fruit of the Durioneæ as an esculent, see Wallace, and "Treasury of Botany," art. "Durio.")

Chemical Society, Nov. 19.—Prof. Odling, F.R.S., president, in the chair.—Dr. C. R. A. Wright read a paper on the action of organic acids and their anhydrides on the natural alkalis, Part II., by himself and Mr. Beckett; being a continuation of that which he brought before the Society at the last meeting.—Prof. W. K. Clifford then made a communication on general equations of chemical reactions, proving mathematically, from the kinetic theory of gases, the generally adopted method for expressing chemical reactions. An interesting discussion ensued, after which the following papers were read:—On propionic coumarin, and some of its derivatives, by W. H. Perkin, F.R.S.; On the composition of autunite, by Prof. A. H. Church; and the action of bromine on protocatechuic acid, gallic acid, and tannin, by J. Stenhouse, F.R.S.

Zoological Society, Nov. 17.—Mr. George Busk, F.R.S., in the chair.—The Secretary exhibited on behalf of the Rev. J. S. Whitmee an egg of *Pareudiastes pacificus*, and an accompanying egg of the Samoan Porphyrio.—A communication was read from Sir Victor Brooke, Bart., containing some remarks on the identity of a certain deer in the Society's collection, which had been determined as *Cervus savannarum*.—A series of eggs of Megapodes (*Megapodius*) transmitted by Mr. John Brazier, was exhibited. These had been obtained from different islands of the Solomon group.—Mr. R. B. Sharpe also exhibited some Megapodes' eggs from the southern part of New Guinea.—Prof. Mivart read a paper on the axial skeleton of the Struthionidæ, and pointed out that judging, by the characters of the axial skeleton, the Emeu presents the least differential type; from which Rhea diverges most on the one hand and Apteryx on the other; that the resemblance between Dromæus and Casuarius is exceedingly close, while the axial skeleton of Dinornis is intermediate between that of Casuarius and Apteryx; its affinities, however, with the existing New Zealand form very decidedly predominating.—A communication was read from Major H. H. Godwin-Austen, describing five new species of Helicidæ, of the sub-genus Plectopylis, from the Khasi and Naga Hills, from Darjeeling and from the Burmese region.—Mr. R. Bowdler Sharpe read a paper on the larks of Southern Africa, in which an attempt was made to reduce into order the numerous genera and species of this difficult group.—A communication was read from Dr. J. Anderson, pointing out that his *Alacacus brunneus* was truly distinct from *M. arcoides* of Geoffr. St. Hilaire.—A communication was read from the Count Turati and Dr. T. Salvadori, describing a new Trogon of the genus *Pharomacrus*, proposed to be called *P. xanthogaster*.—Dr. Albert Günther read a description of a new species of kangaroo from North-west Australia, proposed to be called *Halmaturus apicalis*.—Mr. P. L. Selater read a notice of some specimens of the Black Wolf of Thibet, now or lately living in the Society's menagerie.—Mr. H. E. Dresser exhibited eggs of the various European species of Hypolais, together with those of *Acrocephalus streperus* and *A. palustris*, and pointed out that these two groups (Hypolais and Acrocephalus) approach each other in their eggs as well as in other characters, the two nearest allied in each group being *Hypolais rama* and *Acrocephalus palustris*.—Mr. W. T. Blanford read a notice of two new Uromastix lizards from Mesopotamia and Southern Persia, proposed to be called *Uromastix microlepis* and *Centrotrachelus loriciatus*.—A second paper by Mr. Blanford contained descriptions of two new species of ichneumon, and of a hare collected by Mr. F. Day in Sind, and new to the Indian fauna. One of the former and the hare were believed to be new to science, and were called *Herpestes ferrugineus* and *Lepus dayanus*.

Meteorological Society, Nov. 18.—Dr. R. J. Mann, president, in the chair.—The President read a "Report concerning the meeting of the Conference on Maritime Meteorology in London, August 31, 1874," which he had attended as the representative of the society.—At the request of the president, Mr. R. H. Scott gave a brief account of the recent meeting of the Permanent Committee of the Vienna Congress at Utrecht.—The following papers were then read:—On the weather of thirteen

springs, by R. Strachan, F.M.S.—Table for facilitating the determination of the dew-point from observations of the dry and wet bulb thermometers, by William Marriott, assistant secretary. The chief feature of this table is, that it gives, for the difference between the readings of the dry and wet bulb thermometers, the amount to be subtracted from the reading of the *wet* thermometer instead of from that of the *dry*, as is necessary with the other tables now in use; thus effecting a saving of time of more than one-third of that required by the ordinary method.—On the heat and damp which accompany cyclones, by the Hon. Ralph Abercromby, F.M.S.

Royal Horticultural Society, Nov. 11.—Scientific Committee.—A. Murray, F.L.S., in the chair.—Specimens of the Coffee Fungus (*Hemileia vastatrix*) were shown, and an extract from a letter of Dr. Thwaites on the same subject was read, in which it was stated that the periodicity of the worst phase of the disease had now been demonstrated. Flowers of sulphur, Dr. Thwaites thought, would be a useful but impracticable remedy. The filaments produced by the spores of *Hemileia* penetrate the stomata of the leaf from the outside. It was difficult before to understand what should determine the outbreak of the disease in certain parts of the leaves, the intermediate parts seeming to be quite free from it.—The Rev. M. J. Berkeley showed roots of apple affected with American blight, *Eriosoma lanigera*.—Pears were sent by Mr. H. Webb, the cracking of which Mr. Berkeley attributed to *Spilocaea pomi*, Fr., which he regarded as a state of *Helminthosporium pyrorum*.—Dr. Gilbert contributed, on the part of J. B. Lawes, F.R.S., a note on the occurrence of fungi on the various plots devoted to experiments with different manures on permanent meadow-land at Rothamstead, Herts. The general conclusion appeared to be that fungi flourished the best where the development of the grasses was the least, and where the limited growth of these was due to a deficient supply for their requirements of nitrogen or of potash, or of both. The dry substance of fungi appears to consist of from  $\frac{1}{4}$  to  $\frac{1}{3}$  of albuminoids, yet, as in the case of the highly nitrogenous leguminous crops, direct nitrogenous manures, such as ammonia salts or sodium nitrate, do not seem to be specially favourable to their growth. The dry substance of fungi contains 8 to 10 per cent. of ash, of which 80 per cent. is potassium phosphate. Yet the greatest development of fungi was on plots on which, measured by the requirements of grasses, potash was relatively deficient.—Dr. Voelcker stated that fairy rings occur on poor pastures, and the best mode of extirpating them consists in the application of nitrogenous manures.—Mr. Renny thought that rank-growing grass was not nearly so favourable for the growth of fungi as old pasture or common.

Entomological Society, Nov. 2.—Sir Sidney Smith Saunders, president, in the chair.—Mr. Stevens exhibited three specimens of *Deliopeia pulchella* taken at Arundel and Deal. Prof. Westwood remarked that the late Lieutenant-General Hearnsey had found this insect very destructive to gardens in India.—Mr. Bond exhibited specimens of rare Lepidoptera; amongst them were *Sesia culiformis* (with yellow bands), *Limacodes asellus*, *Nola albulalis*, and *Pterophorus rhododactylus*.—Mr. Jenner Weir exhibited specimens of *Mantis religiosa*, with some egg-cases taken by himself at Meran, in Tyrol.—Mr. McLachlan exhibited a printer's block (such as is used for printing posters), attacked by a species of Anobium, and he was informed that the insect was causing serious damage to the printer's stock. The wood was believed to be pear-tree. He had recommended soaking them in carbolic acid and water.—Dr. Sharp communicated "Descriptions of some new genera and species of Pselaphidae and Scydmanidae from Australia and New Zealand." He added some remarks respecting the importance of gaining a knowledge of the New Zealand fauna, and commented on the probable extinction of many of the species at no very distant period.—Mr. Darwin communicated some remarks by Mrs. Barber, of Griqualand, South Africa, on the larva of *Papilio nireus*, and especially with regard to the colour of the pupa in connection with the objects on which it was placed, it appearing to assume a protective resemblance to the leaves or other adjacent objects. A discussion took place between several of the members as to whether, as suggested by Mrs. Barber, some photographic influences might be at work; but Mr. Meldola stated that no known substance retained, permanently, the colour reflected on it by adjacent objects; but that there was no difficulty in believing that larvæ might become affected in colour by the colouring matter of the food-plant, since chlorophyll in an unaltered condition had been found in the tissues

of green larvæ.—Mr. Ogier Ward sent some notes on a spider's nest found in a quarry at Poissy, near the Seine, with some remarks thereon by Mr. C. O. Waterhouse.—Mr. Butler communicated "Descriptions of three new species and a new genus of Diurnal Lepidoptera from West Africa, in the collection of Mr. Andrew Swanzy."—Mr. C. O. Waterhouse read "Notes on Australian Coleoptera, with descriptions of new species."—Mr. Kirby contributed a review of Boisduval's "Monographie des Agaristidées, published in the *Revue et Magasin de Zoologie*, 1874."—The Rev. R. P. Murray communicated "Descriptions of some new species of Butterflies belonging to the genus *Lycæna*."

Nov. 16.—J. W. Dunning, M.A., F.L.S., the vice-president, in the chair.—Mr. Higgins exhibited some rare specimens of Cetoniidae from Borneo, viz., *Lomaptera Higginsii*, O. Janson, and a remarkable Dynastiform insect, named by Count Castelnau *Westwoodia Horvathi*; also two smaller specimens, which had been supposed to be females of the last-named species, but were more probably those of an unknown species.—The Secretary exhibited a collection of fine species of Lepidoptera sent by Mr. W. D. Gooch from Natal for determination.—The Rev. O. Pickard-Cambridge sent a note on the curious spider's nest exhibited at the last meeting. It was unknown to him, and had it not been for a remark in Mr. Ward's letter implying that the nest he found belonged to a geometrical web, he should have conjectured that it was the work of an *Agelena*. If, however, the nest was appurtenant to a geometrical web, it must belong to a spider of the family Epeiridae. He did not think the sand in the nest was at all designed as ballast, but as a protection from the rays of the sun and also from parasites. Mr. Smith remarked that the mud coating of the nest of *Agelena brunnea* did not preserve that species from parasites, as he had often bred a species of *Pezomachus* from the nests, and he believed, in those cases, the eggs were attacked before the mud coating was added.—Mr. Champion exhibited some rare species of British Coleoptera, viz., *Apion Kyai*, *Abdera triguttata*, *Lymexylon naxosae*, *Athous subfuscus*, *Silvanus similis*, and *Apion sanguineum*.

Institution of Civil Engineers, Nov. 10.—Mr. Thos. E. Harrison, president, in the chair.—On the Nágpur Water-works; with observations on the rainfall, the flow from the ground, and evaporation at Nágpur; and on the fluctuation of rainfall in India and in other places," by Mr. Alex. R. Binnie, M. Inst., C.E. From a study of the records of rainfall at Calcutta, Bombay, Madras, Nágpur, Mauritius, Barbadoes, Adelaide, Hobart Town, Cape Town, New York, Rome, Greenwich, New Bedford, U.S., and Prague, the author deduced that the fluctuations were similar in kind, and that they only differed slightly in amount.

#### MANCHESTER

Literary and Philosophical Society, Nov. 3.—Rev. Wm. Gaskell, vice-president, in the chair.—On the corrosion of leaden hot-water cisterns, by Prof. H. E. Roscoe, F.R.S.—On an improvement of the Bunsen burner for spectrum analysis, by Mr. F. Kingdon, assistant in the Physical Laboratory, Owens College. The students in the Physical Laboratory of Owens College having occasionally experienced some difficulty in obtaining the spectra of some salts with the ordinary Bunsen, through apparently a deficiency of pressure in the gas, it occurred to me that the amount of light even at this deficient temperature might be increased by multiplying the number of luminous points. This is accomplished by broadening out the flame of the Bunsen, that is, causing the gas to issue through a narrow slit instead of a round hole. We have, so far, only made a rough experiment, the slit being about  $\frac{1}{2}$  in. long and  $\frac{1}{4}$  in. wide. The result is, as expected, a more brilliant spectrum.—Some notes on Pasigraphy, by Mr. Henry H. Howorth, F.S.A.—On the existence of a lunar atmosphere, by Mr. David Winstanley.

#### GLASGOW

Geological Society, Nov. 12.—Mr. A. E. Wunsch, vice-president, in the chair.—The Chairman gave a preliminary notice of an interesting discovery which had recently been made in Arran, during a joint exploration of the northern part of the island, in company with Mr. James Thomson, F.G.S. In the course of their examination of those large masses of red sandstone adjoining the carboniferous series of Arran, whose age and geological position have hitherto been doubtful, they came upon a bed of conglomerate of highly glacial



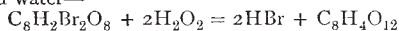
aspect, enclosing angular fragments of various schistose, volcanic, and limestone rocks; and in the latter Mr. Thomson detected the familiar aspect of carboniferous shells and corals. Having once obtained this clue, it was not difficult to find other beds at higher and lower levels, containing similar traces of carboniferous fossils, thus fixing these massive beds of sandstone as undoubtedly of Lower Permian age.—Mr. J. Young, F.G.S., read a joint paper by himself and Mr. David Robertson, F.G.S., on the Polyzoa and other minute organisms found in the carboniferous limestone shale at Hairmyres, East Kilbride.—Mr. D. Bell described some remarkable glacial mounds seen in the neighbourhood of Balquhider, on the line of railway between Callander and Killin. At Kings-Lubnaig and Callander. Mr. Bell next called attention to another series of mounds presenting similar features, which occur in the "side-glen" called "Glen Buckie," or the Calair Burn, that opens out southward from Balquhider and leads on to Glenfinlas in the Trossachs. He then referred to some points connected with the silting up of lakes, as presented by Loch Lubnaig and Loch Voil, which were once in all probability united.

BOSTON, U.S.

Natural History Society, March 4.—The president in the chair.—Mr. Bouvé introduced the subject of Dr. Genth's theory of the metamorphism of corundum, which has lately been published, and explained the meaning of the terms "metamorphism" and "pseudomorphism" as used in mineralogy.—Dr. T. Sterry Hunt then spoke on Dr. Genth's researches on corundum and its associated minerals. The speaker, while praising the industry and chemical skill displayed in the paper of Dr. Genth, insisted upon the importance of some clear definitions as to replacement, alteration, and association in the mineral kingdom, for the lack of which he conceived the learned author, in common with many others, had fallen into errors, and had been led to conclusions wholly untenable. He then explained the nature of pseudomorphs. He had not only carefully studied Dr. Genth's paper, but through the courtesy of that gentleman had examined with him the extensive collection of specimens upon which the conclusions announced by Dr. Genth had been based, and while bearing testimony to his accuracy and skill as a chemist and mineralogist, maintained that all of the phenomena in question were nothing more than examples of association and envelopment. All the facts regarding the corundum-bearing veins described by Dr. Genth have their parallels in the granitic veins with beryl and tourmaline, so common in Montalban, or White Mountain rocks of North America, and in the calcareous veinstones, with apatite, pyroxene, phlogopite, and graphite, of the Laurentian rocks, both of which classes of veins have elsewhere been described by the author.

PARIS

Academy of Sciences, Nov. 9.—M. Bertrand in the chair.—A telegraphic despatch from M. Janssen, announcing the safe arrival of the Transit of Venus Expedition at Nagasaki, was read.—M. Alph. de Candolle presented a copy of his Report for 1873-74, published as president of the Physical and Natural History Society of Geneva.—The following papers were read:—Researches on the dissociation of crystalline salts, by MM. P. A. Favre and C. A. Valson.—Method employed in seeking the substance the most efficacious against Phylloxera at the viticultural station of Cognac, by M. Max Cornu.—Memoir on the secular inequalities of the major axes of the planetary orbits, by M. Emile Mathieu.—On some geometrical constructions applicable to mirrors and lenses, by M. J. Lissajous.—Preparation and properties of dioxymaleic acid, by M. E. Bourgoin. This acid is prepared by heating Kekulé's bibromomaleic acid with silver oxides and water—



The new acid is colourless crystalline, soluble in water and alcohol, hardly soluble in ether. It presents the triple character of a dibasic acid, a diatomic alcohol, and an unsaturated acid. Its isomer, "tricarboxylic acid," obtained from cyanoforn, is a tribasic acid.—Trial of comparison between the principal systems of aerial navigation, by M. Duroy de Briugnac.—On the volcanoes of the Isle of Java and their relation with the pentagonal ridge, by M. Alexis Perrey.—Studies relating to Phylloxera. Experiments made on branches of vines immersed in water holding various substances in solution, by M. A. Baudrimont.—A letter from M<sup>me</sup>. Janssen was read, giving details of the effects of the recent typhoon at Hong Kong.—On a formula for transforming elliptic functions, by M. Brioschi.

—On the laws of the vibratory motion of tuning-forks; second note by M. E. Mercadier.—On electrostatic induction currents, by M. Neyreneuf.—Action of the electric current on the organs of sensation, by Dr. T. L. Phipson.—Reply to recent note by M. Gernez on supersaturation, by M. Lecoq de Boisbaudran.—New observations relating to the circular compass, by M. E. Duchemin.—Bisulphide of carbon and nitric oxide lamp; application to photography, by MM. B. Delachanal and A. Mermet. The photographic intensity of this lamp is stated to be superior to that of magnesium, to be twice as great as that of the oxyhydrogen light, and three times as great as the electric light. Unlike the electric and magnesium lights, the flame is steady and not liable to sudden extinction.—On the chemical nature of the substances which in the organism give the cross by polarisation, by MM. Dastre and Morat.—Note relating to the inundations of the valley of the Po in 1872, by M. Dausse.—At the beginning of the meeting M. Leverrier presented to the Academy chaps. xix. and xx. of his "Recherches Astronomiques," and a complete theory of the motions of Uranus.

Geographical Society, Nov. 4.—M. Delesse, president.—The Secretary announced that the Abbé Petitot, a missionary who has explored the Mackenzie River, has prepared a map of that little known region.—A letter was read from M. de Lesseps, who states that he has by no means given up the project of a Trans-Asiatic railway. His son has been exploring the Himalayas, and reports on the different routes by which the iron road could be carried.—M. Foucher de Careil presented the Society with a copy of his work entitled "Leibnitz and Peter the Great." The author points out three geographical discoveries which he declares are due to Leibnitz. He shows that it was by his advice that Peter the Great sent out the expedition under Behring, the discoverer of the strait which bears his name. The author also mentions three memoirs by Leibnitz on the determination of longitude according to the variation of the compass, a discovery with which Gauss was credited nearly a century later.—M. Simonin gave details of a journey which he made through the north of the United States, and especially in the region of the Great Lakes.

## BOOKS AND PAMPHLETS RECEIVED

BRITISH.—A Course of Qualitative Chemical Analysis: Wm. G. Valentin. new edition (J. and A. Churchill).—Histology and Histo-Chemistry of Man: Heinrich Frey. Translated by Arthur E. J. Barker (J. and A. Churchill).—Post-Tertiary Entomostraca of Scotland: G. S. Brady, C.M.Z.S., Rev. H. W. Crosskey, F.G.S., and David Robertson, F.G.S. (Palaeontological Society).—Bacon's Thoughts, Philosophical and Medical: John Dowson, M.D. (H. K. Lewis).—Erasmus Darwin: John Dowson, M.D. (H. K. Lewis).—Journal of the Society of Telegraph Engineers: Major Frank Bolton and Geo. E. Preece (Spon).—Dental Pathology and Surgery: S. J. A. Salter, M.B., F.R.S. (Longmans).—Doctrine of Energy: D. D. Heath, M.A. (Longmans).—Manchester Historical Recorder (John Heywood, Manchester).

AMERICAN.—Report of the Commissioner of Agriculture, 1872 (Washington, U.S.).—Bulletin of the Buffalo Society of Natural Sciences (Warren, Johnson, and Co., Buffalo, U.S.).—Catalogue of Plants (Army Department, Washington, U.S.).—Report of Ornithological Specimens (Washington, U.S.).

FOREIGN.—Cours de Géologie Comparée: Stanislaus Meunier (Firmin Didot and Co.).—Experimentalphysik: Dr. Adolf F. Weinhold (Leipzig).—Degli Studi Fisici di Ambrogio Fusinieri (Foligno).—Über die Abhängigkeit des Klimatischen characters der Winde: Dr. W. Köppen (St. Petersburg).

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